



## **Gravitational salt tectonics above a rising basement plateau offshore Algeria**

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Seismic data (survey "MARADJA 1", 2003) offshore the Algerian coast have imaged an unexpected deformation pattern of the Messinian salt (Mobile Unit; MU) and its sedimentary overburden (Messinian Upper Unit and Plio-Quaternary) above an actively rising plateau in the subsalt basement. From a geodynamic point of view, the region is undergoing crustal convergence, as attested by the Boumerdes earthquake (2003, magnitude 6.8). The rise of this plateau, forming a 3D promontory restricted to the area offshore Algiers, is associated with that geodynamic setting. The seismic profiles show several subsalt thrusts (Domzig et al. 2006). The data provided additional information on the deformation of the Messinian mobile evaporitic unit and its Plio-Quaternary overburden. Margin-perpendicular profiles show mostly compressional features (anticlines and synclines) that had little activity during Messinian times, then grew more during Plio-Quaternary times. A few normal faults are also present, but are not accompanied by salt rise. By contrast, margin-parallel profiles clearly show that extensional, reactive salt diapiric ridges (symptomatic with their triangular shape in cross section) formed early, as early as the time of deposition of the Messinian Upper Unit, as recorded by fan-shaped strata. These ridges have recorded E-W, thin-skinned gravity gliding above the Messinian salt, as a response to the rise of the basement plateau. We tested this hypothesis using two analogue models, one where we assumed that the rise of the plateau started after Messinian times (initially tabular salt across the entire region), the second model assumed that the plateau had already risen partially as the Messinian Mobile Unit was deposited (salt initially thinner above the plateau than in the adjacent regions). In both experiments, the rise of the plateau generated preferential E-W extension above the salt, combined with N-S shortening. Extension was caused by gravity gliding of the salt from above the rising basement toward the deeper adjacent basins. So far, the deformation pattern of the salt and overburden on the plateau did not allow us to use it as a clear indicator of whether the plateau's rise started before or during Messinian times.